SECTION 34

UTILITIES

1.34.1 GENERAL

(a) The Design Unit shall determine the utilities that will be affected by the construction of any bridge structure at the earliest possible stage. It shall be their responsibility to deal with these utilities and to provide location plans or any other required sketches for their information. When the utility has to be accommodated on the structure, the Design Unit shall secure approval from the representative of the utility and the Bureau of Structural Engineering for the location and method of support.

(b) Due consideration shall be given to the weight of the pipes, ducts, etc. in the design of the beams and diaphragms. Utilities shall be assumed to be placed prior to placing the concrete deck slab, but pipes need not be considered full.

(c) To insure that the function, aesthetics, painting and inspection of stringers of a structure are maintained, the following applies to the installation of utilities on structures:

(1) Permanent installations, which are to be carried on and parallel to the longitudinal axis of the structure, shall be placed out of sight, between the fascia beams and above the bottom flanges, on the underside of the structure.

(2) Conglomeration of utilities in the same bay shall be avoided in order to facilitate maintenance painting and future inspection of steel stringers in a practical manner.

(3) In those instances where the proposed type of superstructure is not adaptable to carrying utilities in an out-of-sight location in the underside of the structure, an early determination must be made as to whether or not utilities are to be accommodated and, if so, the type of superstructure must be selected accordingly.

1.34.2 SUPPORTS

(a) Utilities shall not be supported by a system which requires inserts in the concrete deck slab. They shall be supported directly on structural beams. Also, utilities shall not be supported by a system that requires drilling into prestressed concrete beams. Welding onto structural steel beams is not permitted.

(b) It shall be the responsibility of the design unit to obtain approval of support details from the individual utility companies prior to the Final submission.

1.34.3 PLANS

(a) Preliminary and final General Plan and Elevation drawings shall show information about all existing and proposed utilities carried under the superstructure or in the vicinity of foundations. Complete information as to the name of owner, size, type, abandonment, proposed relocation, material to be furnished by utility company, etc. shall be noted.

1.34.4 DEPARTMENT POLICY

Department Policy is promulgated in the New Jersey Administrative Code (N.J.A.C.) Title 16, Chapter 25, entitled Utility Accommodation.

The following guidance in regard to utility installations on bridges should be followed:

General Considerations

(a) In most cases, attachment of utility facilities to highway structures, such as bridges, is a practical arrangement and considered to be in the public interest. However, attaching utility lines to a highway structure can materially affect the structure, the safe operation of traffic, the efficiency of maintenance as well as the appearance and therefore must be provided for during the design stage.

(b) Since highway structure designs and site conditions vary, the adoption of a standard method to accommodate utility facilities is not feasible; however, the method employed should conform to logical engineering considerations for preserving the highway, its safe operation, maintenance and appearance. Generally, acceptable utility installations are those which will occupy a position beneath the structure's floor, between the outer girders of beams or within a cell, and at an elevation above low superstructure steel or masonry.

(c) The general controls for providing encasement, allied mechanical protection and shut-off valves to pipeline crossings of highways and for restriction against varied use shall be followed for pipeline attachments to bridge structures, except that sleeves are required only through the abutment backwalls. Where a pipeline attachment to a bridge is encased, the casing should be effectively opened or vented at each end to prevent possible buildup of pressure and to detect leakage of gases or fluid.

(d) Since an encasement is not normally provided for a pipeline attachment to a bridge, additional protective measures shall be taken. Such measures shall employ higher factor of safety in the design, construction, and testing of the pipeline than would normally be required for cased construction.

(e) Communication and electric power line attachments shall be suitably insulated, grounded, and carried in protective conduit or pipe from the point of exit from the ground to re-entry. The cable shall be carried to a manhole located beyond the backwall of the structure. Carrier pipe and casing pipe should be suitably insulated from electric power line attachments.

(f) Guy wires in support of any utility will never be allowed to attach to a bridge structure.

1.34.5 PIPELINES ON RAILROAD BRIDGES AND PROPERTY

(a) Design and detail of pipelines on railroad property, bridges over railroad tracks, or bridges carrying railroad tracks shall be in accordance with Specifications for Pipeline Occupancy of Consolidated Rail Corporation Property dated April 11, 1976.

1.34.6 PIPELINE EXPANSION JOINTS (WATER MAINS)

(a) Allowances must be made for changes in pipe length due to thermal expansion and alternate contraction. While Dresser type couplings will take care of the normal amount of expansion and contraction in each length of pipe, Dresser type expansion joints are required where no flexible joints are used in the pipeline or when the amount of concentrated movement at one point is in excess of the amount that can be safely absorbed by the standard coupling.

(b) A Dresser type expansion joint should be located in the pipeline adjacent to every point where expansion means are provided in the superstructure.

(c) Use Dresser type couplings to accommodate the differential movement between the structure and the line itself, and to provide flexibility to accommodate vibrations of the structure. Each coupling can safely accommodate up to 10 millimeters longitudinal movement. This is equivalent to the amount of movement resulting from a 67 EC temperature variation in a 12.2 meter length of steel pipe.

(d) Proper alignment is important to insure free and concentric movement of the slip-type expansion joint. Alignment guides should be designed to allow free movement in only one direction along the axis of the pipe and to prevent any horizontal or vertical movement of the pipe. Suitable pipe alignment guides may be obtained from reliable pipe alignment guide manufacturers. Alignment guides should be fastened to some rigid part of the installation, such as the framework of the bridge. Alignment guides should be located as close to the expansion joint as possible, up to a maximum of 4 pipe diameters. The distance from the first pipe guide to the second should not exceed a maximum of 14 pipe diameters from the first guide. Where an anchor is located adjacent to an expansion joint, it too, should be located as close to the expansion joint as possible - to a maximum of 4 pipe diameters from the expansion joint. Additional pipe supports are usually required. It must be kept in mind that pipe supports should not be substituted for alignment guides.

(e) The main pipe anchors must be designed to withstand the full thrust resulting from internal line pressure; also, the force required to collapse the slip pipe, and the frictional forces due to guides and supports.